

CLAIMS

1. An isolated nucleic acid encoding a protein molecule shown in SEQ ID NO. 1.
2. An isolated nucleic acid molecule of claim 1, wherein the nucleic acid molecule is a D N A molecule.
3. An isolated nucleic acid molecule of claim 2, wherein the nucleic acid molecule is a cD N A molecule, in particular a cD N A molecule comprising a nucleotide sequence shown in SEQ ID NO. 2 or SEQ ID NO. 3.
4. An isolated D N A molecule capable of hybridizing with the complement of the cD N A described in SEQ ID NO. 2 or SEQ ID NO. 3 under stringent condition.
5. A vector comprising a nucleic acid molecule according to one of claims 1 to 4.
6. A vector according to claim 5 wherein said vector is a plasmid, a virus or a bacteriophage.
7. A cell transformed with a nucleic acid molecule according to one of claims 1 to 4, wherein said cell is in particular a bacterial cell, a yeast cell, a mammalian cell, or an insect cell.
8. A protein molecule shown in SEQ ID NO. 1.
9. A protein molecule shown in SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, for use as a diagnostic target for detecting a neurodegenerative disease, preferably Alzheimer's disease.
10. A protein molecule shown in SEQ ID NO. 1, or a fragment, or derivative, or variant thereof, for use as a screening target for reagents or compounds preventing, or treating, or ameliorating a neurodegenerative disease, preferably Alzheimer's disease.

11. An antibody specifically immunoreactive with an immunogen, wherein said immunogen is a protein molecule shown in SEQ ID NO. 1, or a fragment, or derivative, or variant thereof.
12. Use of an antibody of claim 11, for detecting the pathological state of a cell in a sample from a subject, comprising immunocytochemical staining of said cell with said antibody, wherein an altered degree of staining, or an altered staining pattern in said cell compared to a cell representing a known health status indicates a pathological state of said cell.
13. A method of diagnosing or prognosticating a neurodegenerative disease in a subject, or determining whether a subject is at increased risk of developing said disease, comprising:
determining a level and/or an activity of
 - (i) a transcription product of the gene coding for hTARPP, and/or
 - (ii) a translation product of the gene coding for hTARPP, and/or
 - (iii) a fragment, or derivative, or variant of said transcription or translation product,in a sample from said subject and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby diagnosing or prognosticating said neurodegenerative disease in said subject, or determining whether said subject is at increased risk of developing said neurodegenerative disease.
14. A method of monitoring the progression of a neurodegenerative disease in a subject, comprising:
determining a level and/or an activity of
 - (i) a transcription product of the gene coding for hTARPP, and/or
 - (ii) a translation product of the gene coding for hTARPP, and/or
 - (iii) a fragment, or derivative, or variant of said transcription or translation product,in a sample from said subject and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby monitoring the progression of said neurodegenerative disease in said subject.
15. A method of evaluating a treatment for a neurodegenerative disease,

comprising:

determining a level and/or an activity of

- (i) a transcription product of the gene coding for hTARPP, and/or
- (ii) a translation product of the gene coding for hTARPP, and/or
- (iii) a fragment, or derivative, or variant of said transcription or translation product,

in a sample from a subject being treated for said disease and comparing said level and/or said activity to a reference value representing a known disease or health status, thereby evaluating said treatment for said neurodegenerative disease.

16. The method according to any of claims 13 to 15 wherein said neurodegenerative disease is Alzheimer's disease.
17. The method according to any of claims 13 to 16 wherein said sample comprises a cell, or a tissue, or a body fluid, in particular cerebrospinal fluid or blood.
18. The method according to any of claims 13 to 17 wherein said reference value is that of a level and/or an activity of
 - (i) a transcription product of the gene coding for hTARPP, and/or
 - (ii) a translation product of the gene coding for hTARPP, and/or
 - (iii) a fragment, or derivative, or variant of said transcription or translation product,
 in a sample from a subject not suffering from said neurodegenerative disease.
19. The method according to any of claims 13 to 18 wherein an alteration in the level and/or activity of a transcription product of the gene coding for hTARPP and/or a translation product of the gene coding for hTARPP and/or a fragment, or derivative, or variant thereof, in a sample cell, or tissue, or body fluid, in particular cerebrospinal fluid, from said subject relative to a reference value representing a known health status indicates a diagnosis, or prognosis, or increased risk of Alzheimer's disease in said subject.
20. A kit for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, in a subject, or determining the propensity or predisposition of a subject to develop such a disease, said kit comprising:

- (a) at least one reagent which is selected from the group consisting of
 - (i) reagents that selectively detect a transcription product of the gene coding for hTARPP, and (ii) reagents that selectively detect a translation product of the gene coding for hTARPP, and
- (b) an instruction for diagnosing, or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, or determining the propensity or predisposition of a subject to develop such a disease by
 - detecting a level, or an activity, or both said level and said activity, of said transcription product and/or said translation product of the gene coding for hTARPP, in a sample from said subject; and
 - diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, or determining the propensity or predisposition of said subject to develop such a disease,

wherein a varied level, or activity, or both said level and said activity, of said transcription product and/or said translation product compared to a reference value representing a known health status, or wherein a level, or activity, or both said level and said activity, of said transcription product and/or said translation product similar or equal to a reference value representing a known disease status indicates a diagnosis or prognosis of a neurodegenerative disease, in particular Alzheimer's disease, or an increased propensity or predisposition of developing such a disease.

21. A method of treating or preventing a neurodegenerative disease, in particular Alzheimer's disease, in a subject comprising administering to said subject in a therapeutically or prophylactically effective amount an agent or agents which directly or indirectly affect an activity and/or a level of (i) a gene coding for hTARPP, and/or (ii) a transcription product of the gene coding for hTARPP, and/or (iii) a translation product of the gene coding for hTARPP, and/or (iv) a fragment, or derivative, or variant of (i) to (iii).
22. A modulator of an activity and/or of a level of at least one substance which is selected from the group consisting of (i) a gene coding for hTARPP, and/or (ii) a transcription product of the gene coding for hTARPP, and/or (iii) a translation product of the gene coding for hTARPP, and/or (iv) a fragment, or derivative, or variant of (i) to (iii).

23. Use of a modulator of an activity and/or of a level of at least one substance which is selected from the group consisting of (i) a gene coding for hTARPP, and/or (ii) a transcription product of the gene coding for hTARPP, and/or (iii) a translation product of the gene coding for hTARPP, and/or (iv) a fragment, or derivative, or variant of (i) to (iii) for a preparation of a medicament for treating or preventing a neurodegenerative disease, in particular Alzheimer's disease.
24. A recombinant, non-human animal comprising a non-native gene sequence coding for hTARPP or a fragment, or a derivative, or a variant thereof, said animal being obtainable by:
- (i) providing a gene targeting construct comprising said gene sequence and a selectable marker sequence, and
 - (ii) introducing said targeting construct into a stem cell of a non-human animal, and
 - (iii) introducing said non-human animal stem cell into a non-human embryo, and
 - (iv) transplanting said embryo into a pseudopregnant non-human animal, and
 - (v) allowing said embryo to develop to term, and
 - (vi) identifying a genetically altered non-human animal whose genome comprises a modification of said gene sequence in both alleles, and
 - (vii) breeding the genetically altered non-human animal of step (vi) to obtain a genetically altered non-human animal whose genome comprises a modification of said endogenous gene, wherein said disruption results in said non-human animal exhibiting a predisposition to developing symptoms of a neurodegenerative disease or related diseases or disorders.
25. Use of the recombinant, non-human animal according to claim 24 for screening, testing, and validating compounds, agents, and modulators in the development of diagnostics and therapeutics to treat neurodegenerative diseases, in particular Alzheimer's disease.
26. An assay for screening for a modulator of neurodegenerative diseases, in particular Alzheimer's disease, or related diseases or disorders of one or more substances selected from the group consisting of
- (i) a gene coding for hTARPP, and/or

- (ii) a transcription product of the gene coding for hTARPP, and/or
- (iii) a translation product of the gene coding for hTARPP, and/or
- (iv) a fragment, or derivative, or variant of (i) to (iii), said method comprising:
 - (a) contacting a cell with a test compound;
 - (b) measuring the activity and/or level of one or more substances recited in (i) to (iv);
 - (c) measuring the activity and/or level of one or more substances recited in (i) to (iv) in a control cell not contacted with said test compound; and
 - (d) comparing the levels and/or activities of the substance in the cells of step (b) and (c), wherein an alteration in the activity and/or level of substances in the contacted cells indicates that the test compound is a modulator of said diseases or disorders.

SUMMARY

The present invention discloses a novel nucleic acid molecule encoding hTARPP. Further, the present invention discloses the differential expression of hTARPP in specific brain regions of Alzheimer's disease patients. Based on this finding, this invention provides a method for diagnosing or prognosticating a neurodegenerative disease, in particular Alzheimer's disease, or for determining whether a subject is at increased risk of developing such a disease. Furthermore, this invention provides therapeutic and prophylactic methods for treating or preventing Alzheimer's disease and related neurodegenerative disorders using the gene coding for hTARPP. A method of screening for modulating agents of neurodegenerative diseases is also disclosed.